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T R E A T I S E

On the Nature of

Aliments, or Foods, in General.



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A

T R E A T I S E

On the Nature of

Aliments, or Foods, in General;

S H E W I N G

Their good and bad Qualities; and which of them
are most proper in the different Stages of Life.

To which is Added,

An E S S A Y

O N T H E

NATURE of DIGESTION,

And the Vital Powers by which it is performed.

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O N

FOOD, DIET,

O R

A L I M E N T.

THE Health of the human Body evidently depends upon the Quantity and Quality of the *Blood* and *Juices*; whence it is plain, that all those Aliments which preserve and maintain a just Temperament, and a due Quantity of these, are beneficial to Health; and that such as have a contrary Tendency, are to be reckoned unwholesome.

For *Blood* of a just Temperament, neither exceeding nor falling short in Quantity, as it circulates with the greatest Ease through the

B Body,

Body, and is free from all foreign Particles, is admirably adapted to nourish the Parts, and increase Strength; so that it may be called *the real Treasure of Life*.

Blood of a due Temperament, and benign Quality, by its progressive as well as intestine Motion, which continues during the whole Course of Life, is not only continually wasting, but likewise acquires a morbid Disposition, and degenerates into an impure and excrementitious Mass.

Experience has shewn, that the Blood of those who have fasted long, is converted into saline and bilious Excrements, which are discharged by Stool, Urine, and Sweat, and even loses that natural balsamic Quality, which is necessary to Health; and the Mass of Humours is by this Means rendered so thin and fluid, that it becomes entirely unfit for nourishing the Parts. This appears still more plainly from continual Fevers, and hectic Disorders, the Nature of these Disorders being to waste the Juices, and convert the most benign Humours into useless Salt,
and

and bilious Excrements. Labour also, and Exercise, because they augment the intestine and progressive Motion of the Blood, considerably lessen the Quantity of superfluous Humours; as Persons of full plethoric Habits experience, to the no small Advantage of their Health.

Because the Blood, by its continual Motion, is wasted and converted into an excrementitious Mass, utterly unfit for nourishing the Solids, or recruiting that fine Fluid which supplies the Body with Sense and Motion; it is plain that Life and Health cannot be preserved, unless those natural Motions be continually repaired, and new Juices substituted in the Room of those thrown out of the Body as excrementitious.

The Reason is therefore plain, why People stand in need of continual Eating, Drinking, and Evacuations; for Health cannot long be preserved, unless the Place of the corrupted Humours discharged, be supplied by new Juices.

Solid Food of a good Quality, as well as Liquors, recruit the lost Juices ; and therefore all those Aliments that are nearly of the same Nature with the Blood, and easily mix with it, ought to be reckoned among wholesome Aliments.

The Flesh of young Animals, their Juices, and Broths made of them, especially of young Oxen, Veal, and Mutton, afford a large Quantity of Jelly, and on that Account are justly reckoned among the Aliments that are most quickly converted into Blood. All Sorts of Poultry and Pigeons, with their Young, are likewise well disposed for Nourishment ; because they afford a more subtile Jelly, though in a smaller Quantity, than the Flesh abovementioned.

It is worth while to observe, that the clean Animals, which *Moses* commanded the *Israelites* to use in their Sacrifices, were in general such as afforded a good and wholesome Nourishment, abounding more than others in nutritive mucilaginous Juices.

Broths

Broths and Jellies made with Flesh, are therefore with good Reason prescribed for recruiting the Strength of those, who either by Fevers, or Hemorrhages, or Bleedings, have sustained a Loss of Blood ; and People who feed much upon those mucilaginous Aliments, which the *French*, above all other People in the World do, can bear to have Blood taken from them more frequently, and in greater Quantities, than People who are not so much accustomed to them.

The Chyle is the immediate Matter of the Blood, and resembles a natural Emulsion, made of soft, oily, insipid, watery, and mucilaginous Particles ; and therefore all Aliments composed of Parts resembling this, are proper for nourishing the Body, and producing Chyle, and consequently Blood.

Milk, which is nothing but Chyle, is an universal Aliment, and with regard to Nourishment, preferable to all others.

And for this Reason, Milk is given, as the first Aliment, not only to Children, but to robusier Animals, that their Bodies may grow the faster, and sooner acquire Strength and Maturity; for Food that is solid, of a firm Cohesion, and hard of Digestion, does not well agree with young and tender Bodies, because the Stomach and Intestines have not yet acquired that Strength and Force, necessary in the Digestion and Expulsion of solid Foods. Hence a Reason may be assigned, why some People, especially the *Swiss*, who are great Lovers of Milk, and make much Use of it in their Food, grow so very large and tall, that scarce any Nation in *Europe* can equal them in that Particular. *Pliny*, *Tacitus*, *Justin*, *Cæsar* and *Sallust*, give us Accounts of many, who by the Use of Milk, have lived to a great Age; and *Galen** mentions a Man, who using no other Food than Milk, lived more than a hundred Years. In *Holland*, and some northern Countries, and also in

* Lib. v. Cap. 7. de Sanitate tuenda.

Friesland, many use Milk instead of Beer, for their ordinary Drink; and *Ovid* * gives us the Sense of Antiquity, with regard to Milk, in the following Lines.

*Lacte mero Veteres usi memorantur et Herbis,
Sponte sua si quas Terra ferebat †.*

All mild Seeds which abound with a milky Juice, are to be reckoned among the Class of nourishing Aliments.

Hence we see the Reason why Seeds and Grains of most Kinds, such as Wheat, Barley, Oats, Rye, Beans, Pease, Almonds, Chesnuts, Pine-Nuts, Fustic-Nuts, Rice, *Indian* and *Turkish* Corn, are extremely proper for nourishing Animals; and why the Meals of these, baked into Bread, are the principal and most general Aliments made use of; hence also we may be able to

* Lib. IV. Faast.

† In former Times, said he, the Antients made A Feast of Things that eas'ly might be had, As *Milk* and *Herbs*, with bulbous Roots and Oil, The constant Produce of their native Soil.

account for Persons being able to live tolerably on Bread and Water only.

Of all the Aliments Bread holds the principal Place, nor can we possibly be in want of it, without injuring our Health. Its Use is proper at all Seasons, and accommodated to all Constitutions, and may therefore be called an universal Aliment; nor can Flesh, Fish and the like be eaten without it, as they cause a Sickness at the Stomach.

The Texture of the Parts of Bread is admirably adapted to the Nature of the nutritious Juices; for it is mixed with mild, oily, and mucilaginous Particles, and also with a subtile acid Salt, which is very grateful to the Stomach, and quickens the dissolving Power of the Juices. But as all Bread is not made of one and the same Grain, so one kind of Bread is preferable to another, with regard to its healthful Qualities. The best and most nourishing Bread is made of Rye-meal, not very white; but mixed with the smaller and finer Parts of the Bran. For blackish coarse Bread
yields

yeild by Distillation more Oil, which has a more agreeable Flavour, and more effectually recruits Strength, than that drawn from fine Bread. But Bread made with Barley, Oats, *Turkey* Corn, or even of Acorns or Chesnuts, is heavier on the Stomach, and, at the same Time, less effectual in repairing lost Strength.

Eggs, if new laid, and not boiled hard, afford a very speedy Nourishment. The Yolk contains many unctuous, fat and sulphureous Parts; the White, on the other Hand, consists of moist, balsamic Parts, like those of the Serum; so that if any Food be universal, this is certainly such. Eggs are of all other Things most proper when the Body, either weakened by an Effusion of Blood, or wasted by the Shocks of a Fever, requires an immediate Supply of Nourishment. They are vastly beneficial to old Men, who stand in need of good Nourishment, and such as may be easily digested in the Stomach. But, on the contrary, I do not approve of their being used by those who have their Stomachs loaded with Bile, or any Collection of acid Humours; because the more Bodies abounding with im-

pure Juices are nourished, the more they are injured by that very Means. They are known to be fresh by their being pellucid or clear, when exposed to a bright Light, and by their retaining their milky Liquor after being boiled over a strong Fire.

Cheese and Butter are universal and most excellent Aliments.

Since Milk is made into Butter and Cheese, and since the former contains its oily, and the latter its mucilaginous and terrestrial Parts, it is plain that these two, especially with the Addition of Bread and Water, must be a very valuable and universal Nourishment, fit for Persons of all Ages and Constitutions. The newer the Butter is, the more grateful it is to the Stomach, and at the same Time the more conducive to Health; but when long kept, it grows fetid and rancid. The too great and too constant Use of it, however, by relaxing the Fibres of the Stomach, weakens its Tone, and excites Nauseas. Butter joined with Cheese is also very nourishing; but Cheese should be neither too new
nor

nor too old. If too new, it loads the Stomach, and binds the Belly ; if too old, it increases the Acrimony and Impurity of the Humours, as it is endowed with a poignant Taste and fetid Smell.

As the Blood, the nutritive Juices, and in general all the Parts of the Body, are composed of three Elements, the first of which is sulphureous, oily, and inflammable, the second earthy, subtile, and alkaline, more or less fixed, and the third aqueous ; so the several Kinds and Virtues of Aliments, may be commodiously reduced to these three Classes.

Aliments of these three several Qualities, duly mixed with one another, afford a proper Nourishment for the human Body.

The Flesh of Animals, especially when roasted, affords the Body its principal Supply of the sulphureous Part ; but it must be observed, that wild Animals are preferable in this Respect, to those of the tame and

domestic Kind, because their Oils and Salt are exalted by habitual Exercise.

That the Flesh of Animals contains more of a subtile Oil than Vegetables, is plain from this, that in the Summer Flesh very soon turns putrid and offensive, which is not found to be the Case with regard to Vegetables.

Vegetables having an Acid in their Composition, and their Oils, excepting some of the hotter Herbs, are for that very Reason so much the milder. Animals, on the other Hand, have no Acid in their Composition; for all Parts of them, subjected to Distillation, yield a subtile Oil and a volatile Salt; and this hot Oil is what principally excites an intestine and fermentative Motion in the Blood, and proves the Occasion of the penetrating and disagreeable Smell excited by Putrefaction.

The roasted Flesh either of wild Beasts, or wild Fowls, furnish the Blood with a greater Quantity of a light sulphureous Substance,

stance, than boiled Flesh, or those of tame Animals.

The Flesh of wild Animals, or Wild Fowls, is undoubtedly lighter, more subtile and oily, but at the same Time has a less Quantity of gelatinous, balsamic Matter, than the Flesh of tame Animals; because the wild use more violent Exercise, and feed upon drier Aliments. Add to this, that, by the very Roasting, much of the Humidity is evaporated, by which Means the oily Principle of disintangling itself from the rest of the component Parts, and being exalted by the Fire, enjoys its full Liberty, and gains the Ascendant over the other Parts.

Among the Aliments that furnish the Blood with its aqueous Parts, Fish, Pot-Herbs, the milder Roots, and some Kinds of Summer Fruits are reckoned the principal.

To the third Class of Aliments, which supply the Blood with its fixed and earthy Parts, belong all Kinds of Bread, Rice, Pease, Beans,

Beans, Lentils, Chefnuts, Almonds, Cacao, Cheefe, &c.

From what has been said it follows, that all such Aliments as are of a mild Quality, and resemble Chyle and Blood, are fit for Nourishment. And that all such Aliments as either recede from, or are opposite to the Nature of Chyle and Blood, are improper for nourishing the Parts.

All Aliments in which there is too much Acidity, are unfit for Nourishment; because Milk and Blood will not mix with an Acid, being quite opposite to their Natures, and induce a Coagulation of the circulating Juices.

Hence the Reason is plain, why the too liberal Use of Salads, Summer Fruits, especially when crude and unripe, Vinegar, sour Ale, and Wines that abound with an Acid, are so remarkably prejudicial to Health.

No Salt whatever can be mixed with the Blood, Chyle and Milk; for which Reason
all

all Salts, and all Foods too much salted, must be improper and unfit for Nourishment.

Blood or Chyle never incorporate with spirituous Liquors, but rather separate from them ; whence we may easily judge how detrimental the free Use of them is, both with regard to Health and Nourishment.

All sweet Substances, as Sugar and Honey, have no Affinity with the Blood and Chyle, but rather recede from their Nature, since they have an exquisite Taste, which the Blood and Chyle have not.

Though sweet Substances consist of a temperate Mixture of Parts, and may on that Account seem proper for Nourishment ; yet the sweet Particles are Salts of a peculiar Kind, which are dissoluble in Water ; they cannot therefore be joined to the Substance of the Parts, because they are liable to be dissolved by the circulating Fluids.

Aliments, proper for preserving Health, ought not only to contain a laudable Juice,
but

but should also be easily dissolved by the Stomach. Hence it is plain, that all those kinds of Food, which, on account of the Closeness and Compactness of their Texture, are with Difficulty dissolved, are for that very Reason less conducive to Health.

The Flesh of old Animals, Flesh dried in the Smoke, hard Eggs, Sea-Fish of most Kinds dried, and very coarse Bread, on account of the rigid and complicated Texture of their Parts, are for that very Reason concocted with some Difficulty by the Stomach, and converted into Juice and Blood.

As these hard and compact Foods require much Warmth, Abundance of fermentative and salival Lymth, and a strong Stomach to disjoin and break their complicated Textures, so they agree only with robust Constitutions, and People that labour hard; for this Reason, the Inhabitants of some Northern Countries, as *Sweden, Norway, Lapland, Finland, Westphalia, and Pomerania*, are not easily injured by Foods of this Kind; because their Stomachs, being naturally vigorous, and at the same

same Time strengthened by Custom, easily dissolve and digest them.

Vegetables, Roots, Fruits and Herbs, especially if eaten crude, and before they are sufficiently softened by Boiling, are with Difficulty concocted by the Stomach, because their fibrous texture is hard to be dissolved.

Aliments of the vegetable kind, are also for the same Reason heavy on the Stomach, since they produce many Flatulences, which disturb and disorder the first Passages.

To this Class likewise belong unripe Fruits, Pease, Beans, Turneps, Rape, bulbous Roots, the several kinds of Cabbage, Garlick, Onions, Radishes, Sallads prepared of Lettuce, and other Herbs, Pears, Apples, Plums: Honey and Water, Honey, Must and all sweet Fruit of whatever kind; for the Nature of these is such, that they easily ferment, or even become sour, and by Reason

son of their vici'd, adhesive Quality, are resolved into Fumes and Vapours.

The tenacious and glutinous Parts of Animals, among which are the Stomach, the Intestines, the Milt, the Kidneys, the Ears, the Skins, and the Claws, are of hard Digestion, and do not, without Difficulty, yield to the Menstruum of the Stomach.

Fat Substances are not easily digested by the Stomach; for if an Acid, with which Vegetables principally abound, be added to them, they coagulate.

Fat Foods require an alkaline Liquor for breaking and disjoining their complicated Textures; for which Reason a good deal of Bile is requisite, to prevent their proving hurtful to the Stomach. For when an Acid attempts the Solution of fat Substances in the Stomach, hot, sulphureous Vapours and Erućtations, or breaking Wind, are caused, which are very troublesome.

The more viscid, rancid and old, fat Substances are, the more difficult they are to digest ; the new and fresh, yield much sooner to the Action of the Stomach.

Hence, the Reason is plain, why the Fat of Beef is not so hurtful when used in the Preparation of food, as that of Mutton, Swine, or Geese. Hence also, a Reason may be assigned why old Flesh, such as is hardened in the Smoke, as Bacon which has acquired a Rustiness and yellow Colour, is highly improper for the Preservation of Health.

It is necessary, in order to perform the office of the Nutrition, that the small Mouths of the internal rough Coat of the Intestines absorb the Chyle, and convey it to the Blood ; consequently none of those Aliments which either obstruct, or too much constrict their Mouths, can be used without, in some Measure injuring Health.

Since the Mass of Aliments, after being drained and exhausted of their nourishing Parts, by the Separation of the Chyle, ought, by the expansive and contractile Force of the Intestines, to be thrown off from them, it must follow, that all those Aliments are prejudicial to Health, which either pass through the Intestines with difficulty, stop their Motions, or weaken their Tone, and impair their Strength, by suppressing Excretion so necessary to Health.

All Aliments that are acid, astringent, mouldy, glutinous, viscid, austere, or such as are easily coagulated, are for this Reason prejudicial to Health, because they weaken the tone of the Intestines, and by that means, prevent the superfluous Excrements from being discharged.

This Characteristic of Unwholesomeness, belongs to all unripe Summer Fruits, Pears, Quinces, Pomegranates, Medlars, Sloes; also to Sea-biscuits, the Crust of Bread, and such as is mouldy, hard, too coarse, or eaten

warm from the Oven, Gruels made of Pease, Beans, Lentils, and Millet Cakes or Bread, that are heavy, or not sufficiently fermented, Cheese eaten in too great Quantity, all milky and fat Substances ; all these hurt the Constitution still more remarkably, if Wine, Acids, or cold Liquors are drank with them ; for by this means they are firmly coagulated, and adhere very strongly to the Coats of the Intestines, incrustating the Orifices of their small absorbent Vessels ; causing Flatulences or Wind, and Convulsions.

The Unwholesomeness of Aliments is to be estimated from their impairing the fermenting and dissolving Powers of the Stomach, since by that means Crudities are generated.

The Action of the fermenting Juice is impaired by all fat, oily, and very sweet Substances ; by Honey, Hydromel, or Honey and Water, new Grapes, Summer Fruits, green Figs ; the fibrous Roots of Pot-herbs, Cheese and curdled Milk ; all which are
more

more prejudicial to Health, the greater Quantity of them is taken into an empty Stomach.

Every Acid, and every Putrefaction are prejudicial to Health ; and therefore all Aliments which easily grow sour or putrid in the Stomach, may be justly reckoned unwholesome.

An Acid is equally injurious to the first Passages and the Blood ; for it destroys the alkaline and balsamic Quality of the Bile, coagulates the Chyle, and retards the Expulsion of the Excrements. Add to this, that when it is mixed with the Blood, stagnations of the Juices, and bursting of the Vessels are often the Consequence. And when the first Organs of Digestion are affected by putrefied Aliments, and the Putrefaction extends itself towards the more internal Parts, it communicates its own Disposition to the wholesome Juices. Among those Foods, which by their long Continuance in the first Passages grow acid, may be reckoned

reckoned all Summer Fruits, Milk, Honey, almost all Sorts of Tarts, sweet Wine of several Kinds, Must, Hydromel, and unfermented Bread; and those Aliments which soonest grow putrid by a long Stay in the first Passages, as boiled Flesh; for of all Aliments used by us, none have a greater Tendency to Putrefaction than Flesh. It is therefore, for very valuable Purposes, that Nature in acute Diseases, and in Habits abounding with impure Juices, of her own accord, loaths and abhors Flesh; and those Physicians properly assist Nature in carrying on her Designs, who, in such Cases, forbid their Patients the Use of nourishing Broths; for Aliments of this Kind surprisingly increase the Putrefaction, which is the true Cause of the Malignity. For this Reason, when Pestilences, or other epidemical Diseases rage, it is adviseable to abstain from Flesh, and use acidulated Liquors, which strongly resist Putrefaction, and by that Means prove remarkably serviceable; but this is to be understood of those Constitutions which

are

are infirm, weakened by Fevers, or loaded with impure Juices; so that Hippocrates was very just in his Observations, That *the more Bodies, abounding with impure Juices, are nourished, the more they are injured.* Corrupted Fish, putrid Flesh, or that of Animals which laboured under any Disease, have, of all other Kinds of Food the strongest and most direct Tendency to produce a Putrefaction in the Body.

A N

E S S A Y

O N

D I G E S T I O N.

ALL our Food consists of animal or vegetable Substances, Salt and Water, alone excepted; and many of these require a culinary Preparation, in order to render them the more easily dissolvable, by the Actions employed in their Resolution. The Business of Cookery therefore, is to diminish the Cohesion of the Parts of alimentary Substances, and partially digest them before they are taken into the Mouth; to harden them therefore by dressing, is an Error of the worst Consequence with respect

spect to Health, however it may indulge the Palate.

Aliments then, either prepared or crude, are taken into the Mouth, where they are comminuted by Chewing, mixed with the Saliva, and prepared for a future perfect Digestion, towards which, this is the first Step. Manducation or Chewing is performed by means of the *Biventer* ¹, or digastric Muscles, which in acting draw the Chin towards the Breast, and open the Mouth; which is again closed by the Action of temporal Muscles, the *Masseter* ², the external and internal *Pterygoide* ³ Muscles, which being very strong, press the Jaws together with a prodigious Force.

¹ The Biventer or digastric Muscle, so called from its double Belly, is a Muscle of the lower Jaw, which, in Acting, it pulls down, by the Help of an annular Pulley.

² A Muscle of the lower Jaw, which it helps to pull upwards in eating.

³ Muscles of the lower Jaw, the internal draws the Jaw to one Side, and the external draws it forwards.

The first Part of Manducation consists in the inciding, or cutting the Aliment with the Fore-teeth, which is called Biting ; the Food is then applied to the double Teeth called Grinders, by the varied Actions of the *Buccinators* 4, the orbicular Muscle of the Lips, the *Zygomatics* 5, the *Elevator Labiorum communis* 6, the *Elevatores Labii superioris propriae* 7, the *Elevator Labii inferioris proprius* 8, the *Depressor Labii inferioris proprius* 9, the *Depressor Labiorum communis* 10, the *Obliquus Labii inferioris* 11, and the *Platysma Myoides* 12, when these act all together, the Cheeks and Lips are applied so closely to the Teeth, that no Part of the Aliment, whether solid or fluid, can fall from between the Teeth externally ; but when

4 Muscles on each Side of the Face, common to the Lips and Cheeks, forming the inner Substance of the latter. They contract the Cavity of the Mouth, by which Means the Food is thrust forward to the Teeth in Mastication.

5 A Muscle inserted near the Angle of the Lips, which it helps to draw obliquely to one Side.

6, 7, 8, 9, 10, 11, 12, The Names of different Muscles of the Lips, pulling their different Parts into which they are inserted into different Positions.

they act separately, the Aliment is applied to the Teeth in such a Manner as the Circumstances most require. The Tongue also has a very considerable Share in applying the Aliment properly to the Teeth. The Action of Mastication is of so much Importance to Health, that *Hippocrates* long ago observed, that those, whose Teeth are good, live to a very old Age. It is therefore a very great Error to swallow the Food before it is duly masticated.

During the Action of Mastication, the divided Aliment is intimately mixed with the Saliva discharged from the *parotid Glands* ¹³, the internal *maxillary Glands* ¹⁴,

¹³ The Glands, or Kernels behind the ears. They are what Anatomists call conglomerate Glands, that is, made up of a great number of smaller Glands, whose excretory Ducts unite, and form one Canal, through which the Saliva is discharged into the mouth.

¹⁴ Glands situated within the Under-Jaw, one on each Side. They are also of the conglomerate Sort, and the excretory Pipes of the small Glands uniting, form two Ducts, both which open under the Tip of the the Tongue, on the Inside of the Fore-teeth of the lower Jaw.

and the *sublingual Glands* ¹⁵, by innumerable small Ducts in the Tongue, Palate, Gums, and Lips, and from Glands situated in the anterior and inferior Parts of the Palate, from the *Uvula* ¹⁶, and from the *Tonsils* ¹⁷. This Saliva is a thin pellucid Fluid, which does not concrete by heat ; is almost void of Taste and Smell, and when agitated, forms a tenacious Froth ; it is separated by the Glands from the pure arterial Blood, and during Hunger is more copious, and acrid ; after long Fasting it is very acrid, penetrating, detergent, and dissolvent ; it excites and

¹⁵ Glands on each Side of the Tongue. These have generally two excretory Ducts, formed by the Union of those from their small component Glands, discharging the Saliva into the Mouth on each Side the Tongue near its Tip.

¹⁶ The Uvula is a Production of the internal Membrane of the Mouth ; its Substance is very lax, and furnished with a number of small Glands. It is of a conic Figure, and hangs from the Root of the Mouth, at the Extremity of the Passage coming from the nose.

¹⁷ These are round Glands, or Almonds, placed on the Sides of the Basis of the Tongue, under the common Membrane of the Fauces, with which they are covered, each of them has a large Duct, which opens into the Fauces, discharging a mucous and slippery Matter into the Fauces, Larynx and Œsophagus, for the moistening and lubricating those Parts.

increases

increases Fermentation in farinaceous, or mealy, and succulent vegetable Substances, and Syrups; it is swallowed in both Men and Brutes, during Sleep, in a healthy State; and if wantonly spit out, loss of Appetite, Indigestion, and Waistings of the Body are excited: It consists of a pretty large Proportion of Water and Spirits, and a small Quantity of Oil and Salt, which are united into a natural Soap, very well suited to divide the Aliment, and make a perfect Solution.

Hence, we see evidently the Error which those commit, who lavish this salutary Fluid, and solicit a Discharge thereof by smoaking, or chewing Tobacco, or any other Means.

The alimentary Mass thus masticated, and moistened, is thrust towards the *Fauces*¹⁸, while the Teeth are closed, the Aliment confined within them by the Contraction of

¹⁸ The Fauces is the Space about the Mouth, above the Gullet and the Windpipe, and may be seen when the Mouth is open and the Tongue depressed.

the Muscles of the Lips and Cheeks, and the Tongue is so directed, as to occupy all the Space between the Teeth of the Upper Jaw and the Palate. Mean time, the *Genioglossi* ¹⁹, *Styloglossi* ²⁰, and *Ceratoglossi* ²¹, acting successively, form a Cavity at the Root of the Tongue, under the pendulous Part of the Palate, the Uvula and the Tonsils; but above the *Larynx* ²², and *Pharynx* ²³, and before the Membranes which cover the Bodies of the Vertebræ of the Neck, and

¹⁹ A Pair of Muscles of the Tongue, arising from the Insides of the Fore-part of the lower Jaw, and inserted into the Root of the Tongue, serving to pull it out of the Mouth.

²⁰ A Pair of Muscles of the Tongue, inserted into the Root of the Tongue, which draw it upwards.

²¹ A Pair of Muscles of the Tongue, arising from the Sides of the Os Hyoides, and inserted into the Root of the Tongue, which they pull directly into the Mouth.

²² The Larynx, is the upper Part of the Trachea, or Windpipe, lying below the Root of the Tongue, before the Pharynx. It is that Protuberance in the Upper and Fore-part of the Neck, called Pomum Adami, or Adam's Apple.

²³ The Pharynx is the superior Part of the Œsophagus, and may be compared to the wide Part of a covered Funnel, of which the Œsophagus is the narrow Part or Tube.

posterior Muscles of the Pharynx, and bring thither all the Aliment to be swallowed down. Then the Root of the Tongue is expanded, elevated and brought forwards by the Action of the *Genioglossi* ²⁴, *Myloglossi* ²⁵, *Geniobyoidæi* ²⁶, *Mylobyoidæi* ²⁷, *Styloceratobyoidæi* ²⁸, while the *Os Hyoides* ²⁹, is applied to the pendulous Part of the Palate, and the Passage leading to the Nose is closed. At the same time the *Os Hyoides* and *Larynx* are elevated by the Contraction of the *Thyrobyoidæus* ³⁰. Hence the Aliment to be
 swallowed

²⁴, ²⁵ The Name of two Pair of Muscles of the Tongue; the *Genioglossi* have been already described, (Note 19.) the latter are situated transversely, between the Ramus of the lower Jaw, and the Basis of the Tongue.

²⁶, ²⁷, ²⁸ Muscles of the *Os Hyoides*, which they move, together with the Tongue.

²⁹ The *Os Hyoides*, or Bone of the Tongue, is situated in the middle Space, between the Angles of the lower Jaw. It is a small Bone, and resembles, in some Measure, the Basis of the lower Jaw, or a small Bow. The ancient Greeks compared it to their Vowel *υ*, and thence it acquired its Name. The principal use of it is to be the Basis and Support of the Tongue.

³⁰ Another Pair of Muscles belonging to the *Os Hyoides*.

swallowed presses upon the *Epiglottis* ³¹, while the Uvula is depressed by its proper muscles, and the Chink of the *Glottis* ³², closed. At the same Time the *Genioglossi*, *Myloglossi*, *Geniobyoidæi*, and *Myloboidæi*, move the Root of the Tongue, *Os Hyoides* and *Larynx* forwards; and thus opens the *Pharynx*, which is annexed to the Root of the Tongue, the *Os Hyoides* and *Larynx*. And thus the *Fauces* ³³, are opened, and Room made for the Aliment to be swallowed; especially when, at the same Time, the external Pharyngoide Muscles, and some Fibres of the *Massefer*, draw the whole under Jaw forwards, making more Room, and bringing forwards the *Glossopharin-*

³¹ The *Epiglottis* is a small Cartilage, in the Shape of a Tongue, which covers the Orifice of the Wind-pipe.

³² The *Glottis* is the Chink in the *Larynx*, through which the Air passes into the Wind-pipe; this Chink is covered by the *Epiglottis*, to prevent any extraneous Substances from passing down it.

³³ The *Fauces* is described in Note 18.

gæi, 34, *Hyopharyngæi* 35, *Thyropharyngæi* 36, and *Cricopharyngæi* 37, By this means the upper Part of the Pharynx is dilated and applied to what is to be swallowed, and while the upper Orifice of the Pharynx closes, the *Stylopharyngæi* are contracted, and the Muscles of the *Oesophagus* 38, relaxed, for the farther Passage of the Aliment. At the same Time the internal and external Muscles of the *Gargareon* 39, act in such a Manner, as to elevate and expand the Veil of the Palate, and to prevent any Particles from falling either into the Chink of the *Glottis*, or Passage to the Nose. The

³⁴, Muscular Fibres, running along the lateral Edges of the Tongue, down to the Sides of the Pharynx.

³⁵ Muscles arising from the Pharynx, and inserted into the *Os Hyoides*.

³⁶ Broad Muscles arising from the Pharynx, and inserted along the Outside of the Processes of the *Thyroide Cartilage*.

³⁷ Muscles arising from the Pharynx, and inserted into the lower Part of the *Cricoide Cartilage*.

³⁸ The *Oesophagus*, is a Canal situated behind the Wind-pipe, and *Vertebræ* of the Back, extending from about the Middle of the Neck, where the Pharynx ends, to the upper Orifice of the Stomach; through this Canal, the Food after Mastication, passes to the Stomach.

³⁹ The same with the *Uvula*, described Note 16.

very Instant afterwards, all the Muscles abovementioned are suddenly relaxed, and both the *Sternohyoidæi* 40, *Sternothyroidæi* 41, and *Coracoceratohyodæi* 42 act; by which mechanism the broad posterior Surface of the *Cucoide* 43, Cartilage is pressed downwards and backwards against the *Pharynx*. And at the same Moment the *Glossostaphylini* 44, *Pharyngostaphylini* 45, and *Azygos* 46,

40 A long flat Muscle situated on the Fore-side of the Throat, fixed by its lower Extremity to the posterior Side of the Sternum, or Breast-bone, &c. and inserted laterally into the lower Edge of the Base of the Os Hyoides.

41 Two Muscles, like Ribbands, but broader above than below, situated along that Part of the Neck which lies between the Thyroide Cartilage and the Breast Bone.

42 Muscles arising from the Caracoide Process, and inserted into the Basis of the Os Hyoides.

43 An annular Cartilage belonging to the Larynx, resembling a kind of thick, irregular ring, very broad on one Side and narrow on the other; or it may be resembled to a small Portion of a thick Tube cut horizontally at one End, and very obliquely at the other. This Ring is the Base of the five Cartilages that make up the Larynx.

44 Muscles arising from the Basis of the Tongue, and inserted into the Staphyle or Uvula.

45 Muscles arising from the Pharynx, and inserted into the Staphyle, or Uvula.

Muscle of the *Morgagni*, act with a kind of convulsive Motion and great force; so that the pendulous Veil of the Palate then distended and expanded upwards, is suddenly drawn downwards, in such a Manner, as to press the Aliment into the Orifice of the *Oesophagus*, now elevated, and dilated by the Contraction of the *Glossostaphylini*, and *Pharyngostaphylini*. These concur in the same kind of convulsive Motion with the *Glossopharyngæi*, *Hyopharyngæi*, and *Thyropharyngæi*; by which the Tongue, *Os Hyoides*, *Larynx*, and posterior Part of the *Pharynx* are so pressed together, as to assist, at the same Time, with considerable Force, the Intrusion of the Aliment into the Orifice of the *Oesophagus*. Thus the *Pharynx* is closed, whilst the *Oesophagus* contracts, and the Aliment is contained in the Cavity of the *Oesophagus* under the *Pharynx*, and is immediately farther protruded into the Stomach, by the Contraction of the longitudinal and orbicular Fibres of the muscular Coat of the *Oesophagus*.

By this exquisite Mechanism is the Aliment conveyed to the Stomach. But hence it is evident, that many Disorders in these Parts may interfere with deglutition, render it laborious, or utterly subvert it; as Tumours in the Parts subserving thereto, and Palsies of the Muscles. Deglutition may also be prevented by continually swallowing of dry Substances; for by this means the Mucus, which lines the Inside of the Fauces, Pharynx or Oesophagus, is rubbed off and wasted; and thus the Organs subservient to Deglutition are rendered too dry to perform their respective Offices. When the Uvula is lost, or the Veil of the Palate divided, Deglutition is incommoded; in the first Case, the Person thus affected, is subject to a cough when he attempts to swallow, because a Part of the Aliment is subject to fall into the Larynx; in the second Case, the Aliment to be swallowed passes into the Nostrils.

As soon as the Aliment has passed into the Stomach, the superior Part of the inferior
Muscle

Muscle of the Diaphragm, contracts upon the inferior Part of the Gullet, which passes through it, and thus closes up the Stomach.

The Food thus moistened, and at the same Time full of Air, deposited in the close, moist, and warm Stomach, would there spontaneously begin to ferment, or putrify, according to the different Materials of which it consisted, and either way would be greatly changed, either into a sourish, saltish, rancid, or glutinous Mass; were it not that the villous or rough Coat of the Stomach, which immediately embraces the alimentary Mass, supplies it perpetually, by innumerable Ducts, with a thin, pellucid, frothy Humour, abounding with Spirits and a little Salt, which, in the most voracious Animals, is neither alkaline nor acid, but somewhat acrid after long Fasting; and, with a more viscid and mucous Humour, discharged into the Cavity of the Stomach, from the Ducts of certain Glands destined for the Secretion of that Fluid.

If it be considered that the alimentary Mass is moistened by the Saliva brought perpetually into the Stomach from the Mouth, Fauces, and Oesophagus ; that the Stomach dilutes it by the Humours abovementioned ; that the Relicks of former Aliments is mixed and agitated with it ; that the Air contained in the alimentary Mass, by rarifying divides it intimately ; and that the Heat of the Part excites and promotes the action of all these, it is evident that the Food in the Stomach must be macerated, diluted, swelled, attenuated, fermented and dissolved, and thus rendered fit to mix with the animal juices, and pervade the minute Canals of the Body.

Besides these, the Action of the muscular or fleshy Coat of the Stomach must be taken into Consideration, as that Coat closely embraces all the Contents of this Organ, mixes and grinds them together by a kind of vermicular Motion, exposes them to the Action of the surrounding Parts, retains the more gross, and expels the more fluid Parts
towards

towards the *Pylorus* ⁴⁶, and thence into the *Duodenum* ⁴⁷.

Several other Circumstances must be considered as promoting the Digestion of the Aliment in the Stomach; as, first, the Heat communicated to this Organ by all the surrounding Parts. Secondly, the perpetually repeated Strokes of innumerable Arteries in the Diaphragm, or Midriff, the Omentum, or Caul, the Spleen, the Liver, the Pancreas, or Sweat-Bread, the Mesentry, and Peritonæum, upon the Stomach. Thirdly, the violent Vibrations of the Aorta, or great Artery, situated immediately under the Stomach. Fourthly, the Action of the nervous Fluid, with which no Part is more copiously supplied than the Stomach; a Circumstance not yet perfectly understood.

⁴⁶ The Orifice, or that Part of the Stomach that opens into the Intestines.

⁴⁷ The first Division of the Intestines, and about twelve Fingers Breadth in Length. The superior Part is connected to the Pylorus, from which, turning downwards, it runs under the Stomach towards the left Side, and ends at the first of the Windings under the Colon, or largest of all the Intestines.

Fifthly,

Fifthly, the perpetual Comprefure of the Stomach, and all the abdominal Vifcera, by the reciprocal Action of the diaphragm and abdominal Mufcles, during Infpiration and Expiration.

The Effects of all thefe Causes, acting with united Force, must be,

First, To levigate, diffolve, and intimately mix the moft eafily mutible Parts of the Aliment, and fo prefs them thro' the Pylorus into the Duodenum.

Secondly, To retain the more tenaceous Parts ; and, by a Continuation of the fame Causes, to produce the fame Effects upon them.

Thirdly, To render juicelefs the Membranes, Tendons, Cartilages, and Bones of Animals ; and the Skins, Filaments, and the harder Parts of Vegetables ; and thus to expel them out of the Stomach, in order to their being difcharged by Stool.

It is worthy of Remark, that all the Juices employed in the Work of Digestion are neutral and saponaceous, and neither alkaline nor acid. Hence appears the Absurdity of those idle Dreams of Authors, relating to Ferments, or acid or alkaline Menstruums in the Stomach.

But it is not in the Stomach alone that the Work of Digestion is performed; the Duodenum, which is a kind of succedaneous Stomach, has also its Share: Here, and indeed in all the small Intestines, the Aliments receive a farther Solution, and by the Assistance of the Liquor of the Stomach and the Bile, are converted into an alimentary Liquor called Chyle, which being secreted thro' the Intestines from the recrementitious Mass of Aliments, is, by a peculiar Mechanism, conveyed into the Mass of Blood.

The Chyle itself is a milky, insipid Liquor, consisting of oily and mucilaginous Parts, and extracted from the dissolved Aliments. It is a kind of natural Emulsion,
and

and in order to constitute this, it is necessary to form a Mixture of oily and aqueous Parts. That Chyle actually consists of these Parts, is evident from Milk, which is nothing more than Chyle, and may be converted into Butter, Cheese, and Whey.

Hence the Reason is plain, why a Man may live upon Bread and Water alone; for these Substances include, in a proper Degree and Proportion, all the Ingredients of the Chyle and Blood. We also see the Reason, why, in the eastern Countries, Rice serves the Inhabitants instead of Bread; and why, by the Use of Barley, Wheat, Oats, Pease, Beans, and Chesnuts, not only Men, but also every other Species of Animals become fat. Hence also the Reason is obvious, why those Aliments, which are not of a temperate Quality, such as acid, spirituous and saline Substances, the Juices of many Vegetables, Herbs, Roots, with acrid and aromatic Substances, are improper for producing Chyle, and consequently for carrying on the Work of Nutrition.

